Money stock fluctuations

- Money stock measures fluctuate a great deal. Does this mean the central bank keeps changing the monetary base and/or reserve requirements?

- How can central banks miss announced targets for the money stock if they can control it so tightly?

- Our models have assumed away an important source of fluctuations in the money stock.

- Total money stock is the product of the monetary base and the money multiplier.

- Changes in the money stock that the central bank does not control come from changes in the money multiplier.
A puzzling fact in monetary economics is the observed (positive) correlation between the nominal money stock and real output.

Innovations in the money multiplier seem to be positively related to innovations in output.

If one can find the source of fluctuations in the money multiplier, other than reserve requirements or central bank lending, then the puzzle would be solved.

Correlation between two variables does not necessarily imply causality.
Observed money and output patterns

1. Innovations in real output and the nominal money stock are positively correlated.

2. Innovations in the money stock occur before innovations in real output.

3. Innovations in the interest rate help predict innovations in money and output.

4. Given an innovation in the interest rate, innovations in the money stock do not provide additional help in predicting innovations in output.

5. Innovations that link money and output take the form of changes in the money multiplier.
A model of currency and deposits

- Adapt model to allow money multiplier to change even when reserve requirements do not.
- Allow people to choose between currency (fiat money) and bank deposits (inside money).
- No reserve requirements.
- Constant stock of fiat money.
- There are three types of two-period lived risk-neutral people constant in number:
  - workers,
  - entrepreneurs,
  - bankers.
Inside and outside money

- **Workers:**
  - Endowed with goods when young, not when old.
  - Cannot create capital but want money to consume when old.
  - Wish to hold $s_i$ worth of money balances.
  - All look alike, but can reveal identity at cost of $\phi$ goods.

- **Entrepreneurs:**
  - Same endowment and preferences as workers.
  - Can create capital that has one period rate of return $x$.
  - Can invest from their endowment or from others'.
  - The greater $x$, the more they want to invest.
  - Cannot be located by workers.

- **Bankers**
  - Have no endowment and cannot create capital.
  - Able to locate entrepreneurs.
  - Identity is costlessly known to all.
Inside and outside money

- The difference in the rates of return workers and entrepreneurs can obtain encourages intermediation by the bankers.

- Bankers receive deposits from workers and use entrepreneurs to generate capital.

- If the banking business is competitive, the rate of return on deposits is $x$.

- The identification cost $\phi$ can be seen as a transaction cost for withdrawing deposits.

- Currency has no transaction costs and private bank notes are outlawed.
Inside and outside money

- The return to depositing \( s_i \) is \( xs_i - \phi \).

- The rate of return on deposits, net of transaction costs, is \( x - \frac{\phi}{s_i} \).

- This is negatively related to the size of the deposit.

- Currency has a rate of return of 1.

- Let \( s^* \) be implicitly defined by \( x - \frac{\phi}{s^*} = 1 \).

- Individuals with \( s_i < s^* \) use currency, the others use deposits.

- Deposits are used for large transactions.
Money stock fluctuations

\[ x^{-\phi/s_i} \]

Rates of return

\[ s^* \]

Currency

Checks

Purchase size